Future Trends Written Report

Group Name: Engaging the Elderly

Group ID: 10-34

Group Members: Lee Jun Yi (Group Leader), Tham Kit Young, Feng Han Lin, Kenneth Yee, Jared Lim

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Based on Analysis of the Future Scene in Mid-Term and Final Evaluation

STEP 1. Identify Challenges

Challenge #1:

The future scene states that menial jobs such as cleaning at a food court have already been taken over by robots, resulting in many people losing their jobs. (FACT) This could be problematic in the year 2050 as if the trend continues, many adults and elderly may be unemployed as there is low demand for human labour (Vincent, J. 2017), (PROBLEM) and thus may be unable to financially support themselves. (LARGER CONSEQUENCE)

Challenge #2:

The future scene states that Mdm Lee did not want the Elderwatch Sensor in her house, and that it made her uncomfortable, as she refused to feel like a feeble old lady, when she was not. (FACT) A problem that may arise from this is that elderly might feel pathetic and helpless about themselves needing to rely on the robots and this would cause discontent among the elderly population as well as a refusal to use technology, leading to the elderly lacking a helper at home as the home aide population decreases (Bilton, N. , 2013). (PROBLEM) With this refusal, many elderly would lack a home aide to help them with daily tasks, which may become a larger problem in the future given the ageing population and decrease in home-aide workers. (LARGER CONSEQUENCE)

Challenge #3:

The future scene states that the elderly do not have a need to interact physically with others due to the replacement of markets and cafes with drone delivery. (FACT) This will lead to the elderly feeling isolated both emotionally and socially from society as their interaction with society decreases and eventually running the risk of contracting mental illnesses such as depression, (PROBLEM) hence leading possibly to higher healthcare expenditure needed by the government to remedy illnesses associated with depression or other mental illnesses that may result from the increasing rate of social isolation. (LARGER CONSEQUENCE)

Challenge #4:

The future scene states that tax rates were increasing as the population of seniors increased and the workforce shrank, placing more burden on the working adults. The bill for using the Elderwatch sensor was also very costly, as there were insufficient subsidies for family members. (FACT) A problem that may arise is families with elderly may be unable to sufficiently financially support their families as a result of the higher cost of living, (PROBLEM) hence leading to the government needing to spend even more resources on facilities and services for the elderly. (LARGER CONSEQUENCE)

Challenge #5:

The future scene states that government hospitals are plagued with long queues, expensive healthcare costs, extremely limited bed space, and exhausted medical staff, despite heavy investments from the government. (FACT) Because of this, the less-privileged elderly may be unable to afford healthcare due to the rising costs of healthcare (Kacik, A. 2018), and the elderly in need of medical attention may be unable to receive it in time, (PROBLEM) which may result in their condition worsening, reducing the quality of life of the elderly. (LARGER CONSEQUENCE)

STEP 2. Select a Fundamental Problem

Incorporating Challenge(s) # 1,3 and 4

Underlying Problem:

Given the inference that we have made that elderly in the future are likely to suffer from mental illnesses due to the increasing rate of social isolation, and are unable to support themselves due to the high unemployment rate as well as the increasing healthcare costs (CONDITION) how might we make healthcare more accessible (KVP) for the elderly so that all elderly can receive affordable healthcare   (PURPOSE) in Singapore in the year 2050 and beyond? (PARAMETERS)

STEP 3. Produce Solution Ideas

Solution #1:

We, the Ministry of Healthcare Technology, will programme and manufacture a fleet of mobile drones that carry medicine to visit the residences of all elderly once every 2 weeks, in order to do regular check-ups on them, as well as to diagnose any conditions if necessary, while also giving proper medical advice. These services will be subsidised by the government and be extremely affordable, and may be subsidised by current healthcare initiatives such as MediShield. This ensures that most, if not all elderly will receive regular medical attention, and their health would be constantly monitored and kept in check, so that more of them would remain healthy. This initiative will be conducted island wide, and will be tabled for parliamentary discussion by 2040, before a trial run is conducted in 2045, and the service is fully launched by 2050.

    a.   Some companies as Amazon have already started planning for drones to be used for delivery, showing that it is extremely feasible for drones to carry medical supplies in the future. Drones have already undergone trials to deliver food aid and medical supplies to disaster areas such as Haiti. They would be able to transport healthcare supplies to distant areas much more efficient than current transport methods. (Tucker, J., & Knight, R., n.d.)

    b.   As for mentally ill patients, scientists at Stanford University of California developed a robot that functioned as a behavioural therapist. It made use of artificial intelligence to track one's mood through regular conversations and thereby made productive conversation and offer helpful tips to reduce the effects of mental illnesses such as depression and anxiety, which is especially relevant given the progress of society until now and far into the future. (Stark, H. 2017, July 10)

Solution #2:

We, the Elderly Care Group, will organise daily exercise/meal sessions with groups of elderly guided by the robots so that each elderly will be able to keep fit and healthy in the safety and care of the specially manufactured robots that will attend to the elderly's needs. These robots will be able to recommend diets for the elderly and track their health, actively encouraging the elderly to make healthy options. This initiative will be carried out as our Elderly Care Groups will have multiple branches to cater to all elderly. This initiative will be tabled for parliamentary discussion by 2040, with a few trial centres set up around the island by 2045 before the full service is activated in 2050.

    a.   Robots are already in the making to help with elderly who want to age in the comfort of their own homes, becoming extensions of medical care teams. (McCue, T., 2017, October 18)

Solution #3:

We, the Ministry of Health, will offer to implant chips into the elderly to track their activity and monitor their health. These chips will also remind them to clock a certain number of steps per day to lower the risks of contracting chronic diseases such as stroke, hypertension and even cancer. Furthermore, they will remind the elderly to take their medicine and assist them in doing so. This initiative will be carried out at government hospitals around in Singapore. This initiative will be tabled for parliamentary discussion by 2045, followed by a trial run in 2048 before the service is fully activated in 2050.

    a.   Implanting microchips into humans is already a reality. These microchips that are implanted between a person's thumb and forefinger acts as a contactless credit card. Furthermore, having a microchip makes it convenient as one will not leave this device which is able to open doors and unlock computers at home. As scientists make technological advancements in the near future, these microchips can be used for a different purpose and be helpful for the elderly as they age. (Gray, R., 2017, August 02)

Solution #4:

1.   We, the Ministry of Active Ageing, will set up multiple mobile elderly care centres cum clinics, which are buses equipped with state of the art facilities and technology, such as medical facilities and doctors, as well as oral health and hygiene facilities, which will move around the island, and stop at certain areas, such as below certain HDB blocks, for the elderly to board at certain times every day. There will also be volunteers on board to conduct some activities at the various stops. This initiative will also be subsidised by the Ministry. This ensures that the elderly will not only have a platform to socialise, decreasing their risk of mental illnesses due to social isolation, but also accessible and affordable healthcare and dental care, and their condition can also be monitored regularly. This initiative will be carried out island-wide and will be tabled for Parliamentary discussion by 2040, with the first few mobile elderly care centres being dispatched in 2045, and subsequent mobile care centres

    a.   Mobile clinics already exist, though not to the same extent. The National Healthcare Group has already set up a mobile community health centre which takes health screenings and gives advice to patients so they can get better care for conditions such as diabetes. The mobile centre will stop at 17 different locations monthly, including community clubs and Housing Board car parks, and currently supports more than 300 GPs in Singapore's central region. (Cheong, K., 2015, February 08)

Solution #5:

We the Ministry of Health, propose to have a higher budget to develop robots that can act as stand in nurses, and help doctors with basic tasks. However, these robots can also be also be converted to makeshift beds, so when there is a lack of beds, these can also be used. These robots can be used in any situation, thus increasing their efficiency. These robots should be locally developed and manufactured, so as to keep down the costs, and these will be cheaper than hiring proper doctors, and allow to counter the manpower crunch. This initiative should be tabled out for Parliamentary discussion by 2040, and should be pushed out for trials by 2048, after the finding a suitable contractor, and should be pushed out massively to all hospitals by 2050, to have its positive impact felt as fast as possible.

    a.   Although some of AI is being introduced into the new woodlands hospital, the robotics are currently being constrained to simple tasks like helping out with cleaning and food. The role of robots right now is to relieve manpower issues so doctors and nurses can spend more time caring for patients. However, there will definitely be a opportunity for robots to help doctors with medical stuff, greatly reducing the manpower needed. (Chan, L., 2017, April 19)

STEP 4a. Select Criteria

Criterion #1:

Which solution will be the fastest to implement for the government/community so that the problem of the elderly being unable to receive adequate treatment in time can be solved as quickly as possible?

Criterion #2:

Which solution will be the cheapest to implement for the government such that the problem of a high cost of supporting the elderly can be solved without the government needing to fund a significant amount of money only on one part of the community?

Criterion #3:
Which solution will have the largest impact on the whole of Singapore such that large amounts of the community will be benefited at the same time to solve the problem of the ageing population?

STEP 4b. Apply Criteria

Step 3 Sol'n #	Solution Idea	Criteria 1 (x2)	2 (x1)	3 (x3)	Total
# 1	Mobile Drones	6	4	12	22
# 2	Daily Interaction Sessions	10	2	3	15
# 3	Implanting Microchips	2	1	15	18
# 4	Mobile Elderly Care Centres	8	3	6	17
# 5	Healthcare Robots	4	5	9	18

STEP 5. Develop an Action Plan and Evaluate its Feasibility

Action Plan derived from Solution #1 :

We, the Ministry of Healthcare Technology, will programme and manufacture a fleet of mobile drones that deliver medicine to visit the residences of the elderly once every two weeks, as well as perform regular check-ups on them, and diagnose them with any conditions if necessary, while providing them with medical advice. If the elderly's condition is complicated, or medicine needs to be prescribed to the elderly, the drone will get an expert second opinion of a pharmacist, or an experienced doctor via webcam. For this to happen, we will have a team of doctor and pharmacists at the ready to provide assistance if necessary, and this will still be faster and more efficient than having a doctor examine every patient. If the doctors are busy, the elderly will then be referred to a hospital or clinic depending on the severity. In the case of emergency, the drone will also alert the hospital, and at the same time call an ambulance. The usage of drones allows elderly to receive healthcare from the comfort and convenience of their homes, and this particularly benefits the elderly who face difficulty in travelling outside by themselves, as they may be wheelchair-bound or physically frail.

This service will be subsidised by the government, and can be further subsidised by current healthcare initiatives such as MediShield, making it extremely affordable for elderly of all income groups. Because our initiative is government-funded, the drones will be able to visit every elderly's household, and in doing so, ensure that every elderly has access to healthcare, and that their medical condition will be regularly monitored. Furthermore, this is relevant to the future scene, as the drones would reduce the need for elderly to visit the hospital, and reduce the problems of long waiting times and insufficient bed space, which would make healthcare more accessible for those who need it.

This initiative is tabled for parliamentary discussion in 2035, and following that, the drone's program will be coded and created, which controls the drone's movements and functionality. These programmes will also be created with the expertise of experienced doctors, as well as medical databases, to allow the drone to quickly diagnose the elderly if necessary.Then, these programs will be developed into drones manufactured by local companies, such that a trial run can take place in 2045. After that, necessary improvements will be made, and the service will be rolled out starting from 2047, in areas with a higher population of elderly. The drone service is targeted to be fully launched islandwide in 2050.

(Action Plan Continued)

Possible problems that our initiative may face include an elderly distrust of the drones, and they may as a result refuse to allow the drones to enter their houses. To solve and counter this problem, we will firstly get volunteers to go door to door and promote our service, and at the same time reassure the elderly that the drones are unobtrusive and will not pose any inconvenience to them. We will also conduct training sessions to allow the elderly to familiarise themselves and grow to trust robots. Another problem that may be faced is that of safety, as the civilians may have safety concerns regarding drones flying around their homes. To solve this problem, we will programme the drones such that they fly at a safe height above ground, and equip them with sensors which allow them to avoid obstacles. The drones will also be flown at a moderate speed, so that people have time to react in the case of emergency, preventing injuries. In order to prevent cyber attacks on the drones, we propose that a specialised team of officials be assembled whose job is to ensure that the government's systems have the best and most effective cyber security possible, hence reducing the chance of a cyber attack on the drones as much as possible. Lastly, in order to prevent malfunction of the drone, regular maintenance will be performed once every 6 months. A hotline will be set up for citizens to call in the event that the drone malfunctions and it can be repaired immediately.

This plan is humane, as instead of a device constantly monitoring the elderly, our drones will only check in on the elderly biweekly for 30 minutes, so it is not invading the privacy of the elderly, and it is instead similar to a regular home-aide worker visiting them.

Evaluation of Action Plan

Our action plan is effective, and addresses the fundamental problem as it does make healthcare more accessible for the elderly, from the comfort and convenience of their own homes, and at the same time provide the elderly with affordable healthcare, as the service is heavily subsidised by the government, thus allowing all elderly, even the impoverished, to receive healthcare. It is also able to resolve the problem of crowded hospitals and limited bed space/long waiting times as it reduces the need for elderly to visit the hospital frequently, since they are able to receive their medication and do basic check-ups in their own houses, thus they will only need to go to the hospital in emergencies.

Our action plan also meets the three criteria we set, as it is relatively affordable, being largely sponsored by the government, and does not require much additional infrastructure, only the manufacturing of drones. It is also fast to implement, as the whole process is only estimated to take 15 years maximum, given that there is only the programming and manufacturing of drones needed to be done. It also fits the criteria of having a large impact, which is our most important criteria, as it brings benefits to all elderly, and all elderly are able to reap the benefits of this scheme thanks to the subsidies. Another benefit that our solution has is sustainability, as the drones manufactured can be used for years and only needing maintenance once a while, and are not one-time single use.

However, our action plan does have flaws, one of which is safety. As mentioned in our action plan, we are unable to guarantee that the drones will be 100% safe, although we will try our best to do so. Another con of our action plan, as mentioned earlier as a problem as well, is that it leads to over-reliance on technology, and even a small error in the programme, or even worse, a hack of the system, could have a massive impact on the general population.

Our action plan is feasible technologically, as proven by research done. Some companies, such as Amazon, have already started using drones for delivery, and drones have also undergone trials to deliver food aid and medical supplies in countries such as Haiti, showing that it is feasible for drones to be used to deliver medical supplies. (Tucker, J., & Knight, R., n.d.) Scientists at Stanford University of California also developed a robot that functioned as a behavioural therapist, which made use of artificial intelligence to track the

Evaluation of Action Plan (Continued)

patient's mood through regular conversations, made productive conversation and offered helpful tips to reduce the effects of mental illnesses such as depression and anxiety. (Stark, H. 2017, July 10), showing that robots can be used in the future to check up on the elderly.

Our action plan is also feasible ideologically, as elderly may be more inclined to accept our solution, compared to other technology existing within the future scene, such as the Elderwatch sensor, as it is unobtrusive, and does not violate their privacy, as it only visits the elderly biweekly for 30 minutes maximum. Elderly are also becoming more accepting of technology, as can be seen in IDA's Annual Survey on Infocomm Usage in Households 2014. According to the survey results, the total computer usage by elderly aged 50-59 was 60%, and 27% for those 60 years old and above, showing that elderly are readily embracing technology, (Kelleher, J., 2017, October 27) and seems to be a trend that will continue into the future. However, there will still be some elderly skeptical of these drones, but with public education, and the methods mentioned in our action plan, with the reassurance of the elderly, we will get elderly aboard our service.

Furthermore, our plan is viable economically. As of Budget 2018, the budget for the Ministry of Health is 7.2 billion, which is around 2.2% of its GDP. With the population of elderly in Singapore predicted to grow exponentially by 2050, Singapore's expenditure on healthcare will increase as well. This is a trend in developed countries, and Japan's healthcare budget is expected to double as well in the next 30 years. (Chhor, H., . . . Ushio, M., 2008, March). Singapore's healthcare budget may even more than double, considering the number of subsidies in place for the elderly. Thus, we can assume that the healthcare budget will be 5% of the GDP in 2050, which is predicted to be 30 billion out of 600 billion. With reference to the trend of mobile phone prices, with the first Motorola phones costing $9000, and the current IPhone X costing $1000 30 years later, we can assume that there will be a similar trend in the robot industry 30 years into the future. Therefore, with the most recent models of smart robots, such as the ASIMO costing $2.5 million, we can assume that in the future, intelligent robots would cost about $250,000. If 2 million elderly were to use our service, and the drone could make 20 trips in a day, with each elderly only being visited biweekly, only 7200 drones will be required, and this would cost around $1.8 billion, this would only be a small 6% of the healthcare budget in 2050, and would not place too large of a strain on the government.

Evaluation of Action Plan (Continued)

　　　In conclusion, despite having its cons, our action plan is still effective in solving the fundamental problem, as well as meeting the criteria we have set, as it has a wide impact, is relatively affordable for the government, and is also able to be implemented easily. Lastly, it has also proven to be feasible as proven by our research.

Cite the resources you consulted using the APA format.

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